UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project	Date	Author

TITLE

REPORT OF PINE BEETLE SURVEYS

ON THE

MOUNT HOOD NATIONAL FOREST AND ADJACENT TIMBERLANDS

1931 - 1947

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January 26, 1948

U.S. GOVERNMENT PRINTING OFFICE 8—0742

SUBJECT—

INDEX NO.—

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INTRODUCTION

Pine beetles, particularly the western pine beetle (Dendroctonus brevicomis Lec.), aided by adverse climatic and physiological factors have, for many years, been seriously depleting the mature ponderosa pine stands on the Mount Hood National Forest and the privately owned timberlands adjacent thereto. In order to obtain a measure of these losses, systematic surveys were started in these eastside stands in the fall of 1937 as part of the regional cooperative pine beetle survey program. These surveys have three primary objectives: (1) To follow the trend of forest insect-caused losses, (2) to determine the units needing immediate direct control work, and (3) to determine the type of trees most susceptible to insect attack and the units warranting primary consideration in forest management plans.

HISTORY OF THE SURVEYS

The surveys conducted by the Portland Laboratory, in close cooperation with the U. S. Forest Service Office of Timber Management, have been of two types. Intensive surveys have been made on representative 320-acre check plots on which all trees killed by insects or other causes have been numbered and mapped. Extensive reconnaissance surveys of the entire area have been made periodically since 1937. The results of these surveys have been presented in a series of administrative reports (See page 5).

From 1937 through 1942, three half-section check plots were cruised annually in order to secure data on the trend of pine beetle infestations on the Mt. Hood National Forest. During the years 1943-1945 manpower shortages and the press of other duties on the part of the personnel of the Portland Forest Insect Laboratory made it impossible to conduct any surveys on this forest. In 1946 the regional pine beetle survey program was reactivated and intensive cruises were made on two half-section plots. Because the Burnt Mill plot had been cutover, the 1947 survey was reduced to one 320-acre plot.

It is the purpose of this report to review the history of pine beetle losses on the Mt. Hood since 1931 as well as to summarize the results of recent check plot surveys.

PINE BEETLE LOSSES 1931 - 1946

Losses from 1931 to 1942

Prior to the fall of 1937 we had no accurate check on the extent or the trend of western pine beetle losses on the Mt. Hood National Forest. However, the large number and condition of standing snags and the general vigor of the green trees in 1937 clearly indicated that ponderosa pine mortality had been similar to that on adjacent areas having a long series of loss records.

The history of pine beetle losses on the Mt. Hood is reconstructed as follows: Severe drought conditions during the period from 1917 to 1932 resulted in a marked reduction in tree growth and tree vitality throughout the east-side ponderosa pine region. The conditions on the Mt. Hood were especially critical. Pine beetle losses began a marked upward trend about 1929 and in 1932 reached an all-time high. As a result of the extremely cold weather during the winter of 1932-1933 (which killed approximately 61 percent of the overwintering pine beetle broods on the Mt. Hood) plus a marked improvement in growing conditions, pine beetle losses on this forest began to decline and in 1936 reached a low point.

In 1937, when our surveys were started on the Mt. Hood, the trend of pine beetle losses had again turned sharply upward. This upward trend continued until 1941, when a slight drop in insect caused losses occurred. During 1942 the infestation trend turned upward again. A record of the actual ponderosa pine mortality on each survey check plot since its inception is given in Table 1.

Losses from 1943 to 1945

As mentioned above, it was impossible to conduct surveys on this forest during the period from 1943 to 1945 inclusive. The record of pine beetle losses on two check plots for this period was obtained on August 13 and 14, 1946 when the plots were cruised by a three-man crew employed through the Office of Timber Management of the Forest Service. The crew was composed of W. H. Daudistel, Crew Leader, A. M. Fisher, and D. Weston, and were directed by the writer.

Because of the uncertainty in accurately back-dating the death of insect-killed trees, the losses for this three year period were not separated by years (Table 1). The average annual mortality on the two plots for the three years 1943-1945 was at the rate of 97 trees per section, 119 board feet per acre, or 1.2 percent of the 1937 stand volume. (Actually, the percent of stand killed during this period was higher than 1.2 percent because the green stand has been depleted by insects since the surveys began; however, for the sake of comparing the trend of these losses since 1937, the volume of ponderosa pine in 1937 has been used in this report).

From the records on the Warm Springs Indian Reservation to the south, where annual surveys have been maintained and from the regional trend of pine beetle infestations, we are certain that losses on this forest dropped to an all-time low in 1943. During the next two years, the trend again turned upward and slightly higher losses were recorded each year.

Losses in 1946 and 1947

The record of pine beetle losses on the Happy Ridge plot in 1946 was completed on September 3, 1947 by a three-man Forest Service crew composed of W. K. Coulter, Crew Leader, R. L. Anacker, and L. Piha. Ponderosa pine mortality in 1946 (Table 1), was found to be at the rate of 100 trees per section, 117 board feet per acre or 1.0 percent of the stand. Thus, the trend of insect-caused losses is slightly lower than the average for the previous three-year period.

At the time of the 1947 survey, on September 3, approximately 50 percent of the total current loss would normally have been marked. However, on the Happy Ridge plot only 9 trees, having a total of 8,290 board feet, were found by the crew to have been killed to date in 1947. In view of the past history of the western pine beetle on this plot, it is felt that this number of trees may not accurately represent current infestation conditions. The indications are that current barkbeetle populations may be lower than at any time during recent years. The total mortality for 1947 will not be determined until another survey can be made during the fall of 1948.

ESTIMATED GROSS MORTALITY FOR THE FOREST

Gross ponderosa pine mortality over the Mt. Hood National Forest as a whole during the period from 1931 to 1946 inclusive has been estimated to be 225,000,000 board feet. This represents a gross loss of 21.4 percent of the stand volume during the 16-year period. The distribution of this loss by years is given in Table 2.

It is felt that most of the 83,000,000 board feet, estimated to have been killed from 1931 to 1936 (Table 2), occurred during the three year period of 1931 to 1933 inclusive. During these three years, pine beetles caused tremendous losses in all east-side ponderosa pine stands. This epidemic resulted in a serious depletion of mature and overmature timber over large areas on several forests. On the Mt. Hood National Forest, at lower elevations in marginal sites, the mature ponderosa pine stands were nearly wiped out.

As mentioned above, the extremely low temperatures during the winter of 1932-1933, plus greatly improved growing conditions combined to reduce the level of pine beetle losses during subsequent years. This reduction was more noticeable on other forests than on the Mt. Hood National Forest, Warm Springs Indian Reservation, and the Sisters Area of the Deschutes National Forest. On these forests, pine beetle losses have been consistently high and have resulted in an appreciable reduction in the volume of mature and overmature high-value timber.

CONCLUSIONS AND RECOMMENDATIONS

One has but to ride through the pine stands of the Mt. Hood National Forest to obtain an idea of the depletion caused by repeated and uncontrolled epidemics of the western pine beetle. Fortunately, the severity of these losses during recent years has decreased slightly from that of the early 1930's; however, the mortality on this forest is still close to the highest in the region.

The solution of the pine beetle problem on this forest lies in the field of timber management. A selective cutting program in which all trees susceptible to pine beetle attack would be salvaged before they are destroyed by beetles appears to be the answer. A commendable start, through four active timber sales, has been made in this direction. Over most of the area a cut approaching a utilization cut of ponderosa pine appears desirable while in the less critical portions of the forest a light selection cut should bring about the reduction of the high annual mortality.

It is recommended that the remaining portions of this forest be brought under active management just as rapidly as possible.

OTHER REPORTS OF PINE BEETLE SURVEYS ON THE MOUNT HOOD NATIONAL FOREST

1. Buckhorn, W. J. Report of Pine Beetle Surveys on the Mount Hood National Forest. 1937-1939. April 1940.

2. " " " Report of Pine Beetle Surveys on the Mount Hood National Forest, Season of 1940. April 18, 1941.

3. Whiteside, J. M. Report of Pine Beetle Surveys on the Mount Hood National Forest and Adjacent Timberlands, Seasons of 1941 and 1942. March 1943.

Table 1. Summary of Pine Beetle Losses on Check Plots, Mt. Hood National Forest, 1937 - 1946

Check Plot	Ponderosa Pine Acres	1937 Volume (Bd. Ft.)	Year	Gross Insect-Caused Losses No. of Trees	Total Volume	Trees Per Section	Bd. Ft. Per Acre	% of Stand
Eight Mile Cr. T2S, R11E, Sec. 1 N/2	320	2,350,000	1937	35	17,170	70	54	.73
			1938	57	31,760	114	99	1.35
			1939	95	47,500	190	148	2.02
			1940	237	144,100	474	450	6.13
			1941	127	75,600	254	236	3.22
Total 1937 - 1941				551	316,130	1,102	987	13.47
Average Annual Loss				110	63,250	220	197	2.69
Burnt Mill T4S, R11E, Sec. 23S/2	320	2,420,000	1937	72	41,260	144	129	1.70
			1938	115	60,000	230	187	2.48
			1939	100	56,060	200	175	2.32
			1940	138	53,430	276	167	2.19
			1941	118	72,740	236	227	3.00
			1942	140	85,440	280	226	3.52
			1943					
			1944	158	114,480	316	358	4.73
			1945					
Total 1937 - 1945				841	483,410	1,682	1,505	19.94
Average Annual Loss				93	53,710	186	168	2.22
Happy Ridge T3S, R11E, Sec. 26S/2	320	3,740,000	1937	69	45,490	138	142	1.21
			1938	111	72,230	222	226	1.93
			1939	112	80,000	224	260	2.14
			1940	154	112,400	308	352	3.00
			1941	129	87,250	258	272	2.33
			1942	94	92,690	188	290	2.48
			1943					
			1944	134	113,350	268	354	3.03
			1945					
			1946	50	37,350	100	117	1.00
Total 1937 - 1946				853	647,720	1,706	2,022	17.12
Average Annual Loss				85	64,800	171	202	1.71
Total Losses for 2 Plots 1937 - 1945				1,644	1,093,820	1,644	3,410	36.06
Average Losses Per Plot 1937 - 1945				822	546,960	1,644	1,710	17.75
Average Annual Loss Per Plot				91	60,770	182	190	1.97

Table 2. Estimated Gross Ponderosa Pine Mortality on the Mt. Hood National Forest, 1931 - 1946.

Year	Gross Volume of Pine Killed	Percentage of Stand
1931 - 1936	83,300,000 Board Feet	9.2
1937	6,600,000 " "	0.6
1938	11,400,000 " "	1.0
1939	11,700,000 " "	1.0
1940	23,000,000 " "	2.0
1941	16,000,000 " "	1.4
1942	18,000,000 " "	1.6
1943 - 1945	42,000,000 " "	3.7
1946	10,000,000 " "	0.9
Total 16 Years	225,000,000 Board Feet	21.4%
Average Per Year	14,000,000 Board Feet	1.3%